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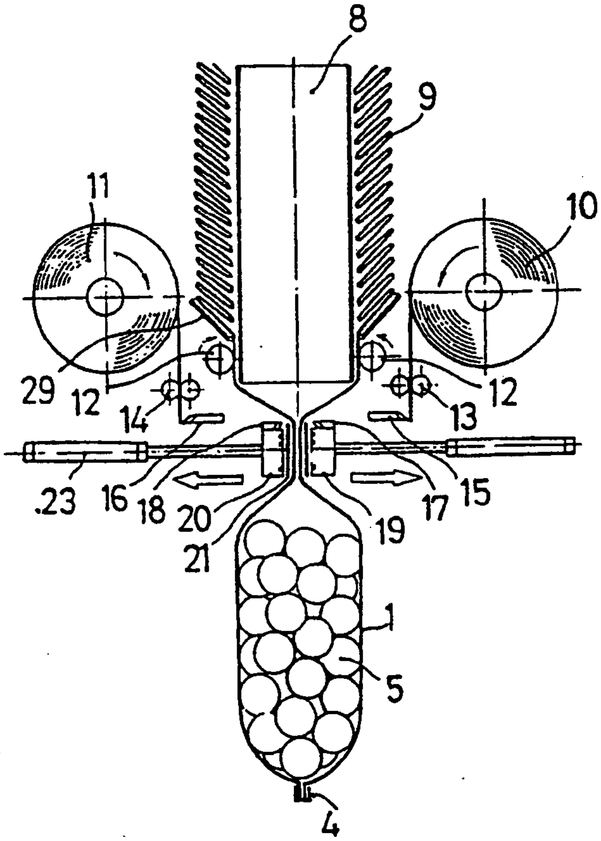
(54) A process for the continuous production of net bags, machinery for manufacturing them and the bag produced by this means.

(57) A process for the continuous production of net bags, the machinery for manufacturing them and the bag produced by this means.

The process consists of the advance of a tubular sleeve of netting material (1), the drawing forward of strips of a laminar material, the filling of the bag, the parting off of two lengths of the said strips (21), the welding by heat sealing of the said strips and the separation of the bag from the next in the cycle.

The machine consists of a vertical tube (8) for the introduction of the products (5) into the bag, this tube surrounded by a sleeve of netting material (9) with the lower extremity open, a pair of rollers (12) for the controlled feed downwards of the netting sleeve (9), another two pairs of rollers (13, 14) for the drawing down of the plastic laminar strips, two mutually opposed sliding heads (19, 20) each carrying a cutter blade (17, 18) to act in conjuction with another fixed blade (15, 16), heating elements (24) for the welding operation, suction orifices, a cutting die and a hot wire cutter (25).

FIG.8



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A PROCESS FOR THE CONTINUOUS PRODUCTION OF NET BAGS, MACHINERY FOR MANUFACTURING THEM AND THE BAG PRODUCED BY THIS MEANS

This Invention Patent refers to a manufacturing process for the continuous production of bags made from a netting material, the machinery for carrying out this process and the bag obtained therefrom, all of which offer considerable advantages compared to the processes and machinery in use hitherto in that by means of a totally automatic operation one can obtain a net bag having a high strength especially suitable for quality agricultural products, of pleasing appearance and serviceable and having a rectangular upper section providing space for publicity, characteristics of the product contained in the bag and other indications such as the weight and type of product etc.

Bags composed of netting for agricultural products formed from a sleeve of netting enveloping a vertical tube are already known. The lower end of the netting protrudes beyond the extremity of the tube and it is closed by means of a cramp or similar type of closure. The products to be packed are allowed to fall into the closed end of the net causing it to stretch out by their own weight, the upper end of the net then being closed by another cramp.

In some cases, to facilitate transport of the bag there is attached thereto, a strengthening strip parallel thereto and attached to it by the cramps at the extremities.

The bag so produced lacks aesthetic value, adequate strength and means for easy transport.

This invention overcomes these disadvantages by providing a process and the corresponding machinery for the manufacture of a strong bag in which the extremities of the tubular sleeve of netting are heat sealed with the bag closure strips at the extremities, the upper extremity having a handle stamped out so as to offer an effective means of carrying by the customer, the whole having a presentation similar to that of a superior shopping bag as distinct from the simple sack type bags of a rough spherical shape cramped at its two ends.

The process claimed in this patent for the manufacture of net type bags incorporates the utilization of two opposing mobile heads which in conjunction with rollers which cause the feed of the tubular body of netting and the lateral plastic strips produces in one sole operation closure of the already filled bag, closure of the lower end of the following bag, provision of space for publicity, stamping out the handle and separation of the filled bag from the continuous sleeve of netting.

This Patent basically comprises a vertical tube through which the products to be packed in the bag are passed, these already having been graded as to their size and grouped in quantities to be contained in the bag. At its upper extremity the tube is enveloped by a sleeve of netting of indefinite length suitably folded to form an annular body supported by a component in the shape of a truncated cone situated around the vertical tube in the vicinity of its lower extremity but separated therefrom to the extent of a circumferential space through which the tubular sleeve of netting can pass, being drawn by means of rotating wheels which cause it to advance towards the lower zone of the system.

At diametrically opposed positions on the assembly comprising the vertical tube and the surrounding sleeve of netting are placed two reels of plastic strip on which is printed the required publicity matter and the appropriate references to the product contained in the bags. This plastic strip is fed out from the respective reels by means of pairs of rollers which act in conjunction with the wheels causing the advance of the netting sleeve. A signal on the said strip detectable by a photo-electric cell or some means of limit stop control the amount of feed of these strips and their correct positioning.

The following stage is the introduction of the product to be packed into the bag through the vertical tube the lower end of the bag having been closed in the manner described below. The two heads located below the reels of strip advance in opposed directions until they are facing each other. Each head is fitted with a knife blade, succion orifices connected to a vacuum pump, various heating elements and a heated cutting wire, one head having a die for stamping out the handle, the other head having the corresponding punch to mate with the die. The knife blade on each of these heads, known for convenience as the mobile knives, is set to correspond with a fixed blade located below the plastic drawing rollers. Thus the head in the course of its travel, together with the mobile knife blades on encountering the fixed blades, cuts a length of the plastic strip which is held in place due to the action of the suction through the vacuum orifices. The lengths of detached plastic strip are then heated by the heating elements in the heads so that on coming together and gripping the upper extremity of the tubular net sleeve the said heads, by means of the combination of pressure and heat caus the heat sealing effect to weld together the body of netting held between them and the two plastic strips.

The minimum of three heat seal weld lines are across the full width of the netting, the two lower lines acting as closures to th net bag but spaced such that there is space between them forthe handle, this being in the form of a pressed out rectangle with the shorter sides curved while the third line of heat seal provides the lower end closure of the following net bag. The final operation prior to the separation of the heads is the cutting of the bag by means of a heated wire thus separating the area containing the two heat seal lines corresponding to the net bag below the heads and complete from the area containing the single heat seal line on the lower part of the following bag which in turn will then become the next cycle of the operation of the machine, and so forming the bottom closure of that bag.

Before the heads separate from each other the next cycle commences by wheels controlling the netting pulling through the appropriate length of the netting and the rollers controlling the plastic strip withdrawing a preset length thereof into position ready for the succeeding operations in the above described sequence.

The resulting bag has a high strength due to the composition of its extremities being of a 'sandwich' construction: plastic strip - netting - plastic strip, including the area containing the cut out for the handle, the netting consequently extending from one extremity of the bag to the other.

To facilitate the comprehension of the general characteristics of this process and of the machinery for manufacturing the bag according to this process as well as the net bag so produced, object of this invention Patent drawings are attached to this specification which describe and illustrate one practical enbodiment of the principles of the Patent claims with the proviso that they should be read in the widest possible sense as generalizations and as not being restrictive but merely in the sense of being informative.

In the drawings:

Figure 1 is a frontal view of two net bags manufactured in accordance with the claims of this invention, prior to their separation. Figure 2 is a lateral view of the same bags.

Figure 3 corresponds to Figure 2 but showing the bags after their separation and Figure 4 is the frontal view corresponding to the Figure 3.

Figures 5 to 9 illustrate the successive phases in the production process according to the present invention with schematic illustrations of various parts of the machinery required for the manufacture. Thus, Figure 5 shows the netting and the length of strip already drawn from their respective feed points by their corresponding rollers. Figure 6 shows the stage of filling the bag and in Figure 7 can be seen the first stage of the movement of the heads carrying the mobile knife blades towards each other and the static blades, having completed the cutting of the plastic strip. In Figure 8 can be seen the heat sealing operation on the mouth of the bag with Figure 9 showing the final stage of the cycle with the filled bag separated from the succeeding one and the carrier heads returned to their original stations.

Figure 10 is a detail cross sectional view of one of the heads, Figure 11 showing the various heat seal lines, the cutting line and the cut-out all corresponding to the cross section view in Figure 10.

In order to facilitate the identification of the several phases of the process of manufacture and the diverse components of the net bag and the machinery used in its manufacture as well as the bag itself, the accompanying drawings show numbered references which carry corresponding references in the ensueing text of description.

The net bag as shown in Figures 1 to 4, produced in accordance with the processes, object of this invention patent is derived from an initial tubular sleeve of netting -1- which equally can be extruded in fabric form, with an upper closure element -2- and another lower closure element -3-, it being characteristic that the lower closure element -4- of the following bag in the manufacturing train corresponds to the element -3- of the bag already completed, it being formed in the same operation as that in which the closure -2- is made.

This upper closure -2- of the bag is of a rectangular shape with at least two heat seal lines -28- between which there is a cut-out -6-, the structure of the closure element being that of a sandwich consisting of a plastic strip -21-, the tubular sleeve -1- and another plastic strip -21-, carrying on the outer faces information concerning publicity and a reference to the products contained within the bag.

As may be seen in the Figures 3 and 4, the operation of separating the completed bag from the net sleeve -1- is carried out by cutting off the former from the latter on the line -7- in Figures 1 and 2 such that the part -4- which remains united with the sleeve -1- becomes the closure element of the bag which is the next in the manufacturing cycle.

The machine employed in the manufacture of the net bags consists of a vertical tube -8- through which pass the products to be packaged in the bag -1-, which is surrounded by the netting -9-, suitable folded so that it can pass at its lower end through a space between the tube -8- and the truncated cone support -29- of the netting sleeve, as it is required, drawn by the rollers -12-.

Either side of the tube -8-, in diametrically opposed positions are placed coils -10- and -11- of thermoplastic strip carrying thereon publicity and references which may be relevant to to the product. These plastic continuous strips are caused to feed down by means of rollers -13- and -14-. An end stop or signal on the strip itself is provided so that the required length of strip -21- is positioned in front of the heads. -19- and -20-. The strip signal can be detected by means of a photelectric cell.

The carrying heads -19- and -20- are located below the coils -10- and -11- at the level of the closures and are at least the full width of the bag. They are actuated by the two opposing pneumatic cylinders -23-, their final position being mutually closed against each other. Each of the heads carries a knife blade -17- and -18- which acting against the fixed knife blades -15- and -16- separate the plastic strip length -21- from the coil by cutting. Also on the said heads are various heating elements -24-, producing lines of heat seal -28- longitudinally across the strip and a number of transverse holes -30- connected by suitable tubing to a vacuum pump design- to hold the plastic strip -21- in place while it is still part of the coils -10- and -11-, preventing it from falling and during its preheat before sealing

In addition one of the heads is fitted with a heating wire -25- which causes the separation of the bag along the cutting line -7-, this method of cutting being prefered in that it forms a peripheral rib along the cutting line which would not be the case using a conventional knife blade cut. One of the heads carries a die -27- to stamp out the handle of the net bag.

The net bag manufacturing process is shown in detail in Figures 5 to 9. In the first of these can be seen the initial stage of the production cycle in which the required length of netting sleeve -1- is pulled through by the rollers -12- while at the same time the pairs of rollers -13- and -14- similarly draw two lengths -21- of the plastic strip from the coils of strip -10- and -11- so that they can form the overlap closure strips -2- and -3- of the bag. Figure 6 shows the following stage of introduction of the product -5- into the bag.

Figure -7- shows the next stage with the two heads -19- and -20- advancing towards each other, the plastic strips -21- being held by suction and being cut off from the coils -11- and -10- by the action of the mobile knife blades -17- and -18- mounted on the heads in conjunction with the fixed knife blades -15- and -16- located behind the plastic strip. Figure 8 shows the two heads in their forward position on the level of the bag closure for the heat sealing operation of the two legths -21- of plastic strip which has been preheated by the heating elements -24- contained in the heads -19- and -20-. The die and punch combination -27- then cuts out the handle perforation -6- this being in the shape of a rectangle with the two lessor sides curved but with the upper side not fully separated.

Finally as may be seen in Figure 9 the net bag is separated from the length of netting sleeve -1-, by a cutting line -7- made by the heated wire -25- so that the upper part of the closure strip becomes the closure -4- of the lower extremity of the next bag to be filled in the ensueing cycle of manufacture.

Anything which does not alter, modify affect or change the essence of the above described process is a variable for purposes of this Invention Patent.

Claims

1.- A process for the continuous production of bags made of a net material characterized in that it comprises an initial stage in which a tubular sleeve of netting, woven or extruded feeds out in a length to suit the final dimensions of the bag, this stage being simultaneous with the feed out of two strips of a plastic material, followed by the operation of filling the bag, followed by another stage in which two mobile mutually facing heads located in diametrically opposed positions with respect to the mouth of the bags, move such that they cut two lengths of the plastic strip then continue to approach each other to a point where they can cause the plastic strips to be heated by means of heater elements provided transversally in the said heads and at a following stage in which the heads have attained their limit position, they cause the heat sealing of the two plastic strips between which is what will be the mouth of the net bag prior to the separation of the bag from the tubular sleeve of netting, the said heat sealing comprising at least three transverse lines of weld, this stage being followed by the cutting of the welded head section of the bag so as to separate it from the sleeve this cutting line being between the two upper weld lines such that the part which stays integral with the tubular sleeve becomes the lower extremity closure of the next bag to be manufactured.

2.- A process for the continuous production of bags made of a net material as in the previous claim. characterized in that during the stage in which the two heads are situated in proximate opposition to each other, and the bag mouth heat sealing operation is proceeding there is produced a cutting out operation so as to form a handle situated centrally between the two marginal heat seal lines of the bag mouth.

3.- A machine to manufacture bags made from a netting type material as in the previous claims, of the type consisting of a vertical tube through which are fed the products to be wrapped surrounded by a tubular sleeve of netting with its opening at the lower extremity characterized in that it comprises a pair of rollers actuating the controlled drawing through of th netting material and two other rollers which draw down simultaneously, from two reels, predetermined lengths of a pre-printed plastic strip, also comprising two sliding heads which can attain a proximate opposing position each of which carries a knife blad placed in conjunction with another fixed knife blade, heating elements for the purpose of welding by heat sealing and suction orifices to hold the plastic strip in place prior to its being parted from its respective reel while at least one of the said heads carries a cutting die and a wire or a thermal cutting blade so as to effect the final separation of the already formed bag from the closed lower end of the following bag.

4.- A bag made from a netting material as in the previous claims characterized in that it is formed from a length of tubular sleeving of a woven or extruded netting material and of which the extremities are closed by means of a heat seal weld applied to a structure consisting of a sandwich defined by a pair of plastic strips between which are the extremities of the bag.

5.- A bag made from a netting material as in the previous claims characterized in that the one of the closure elements at the extremities being of greater width than the other has thereon two lines of marginal heat seal weld longitudinally, a cut out handle and inscriptions of a publicity nature and or references to the product to be contained in the bag, all pre-printed before assembly.

FIG. 1

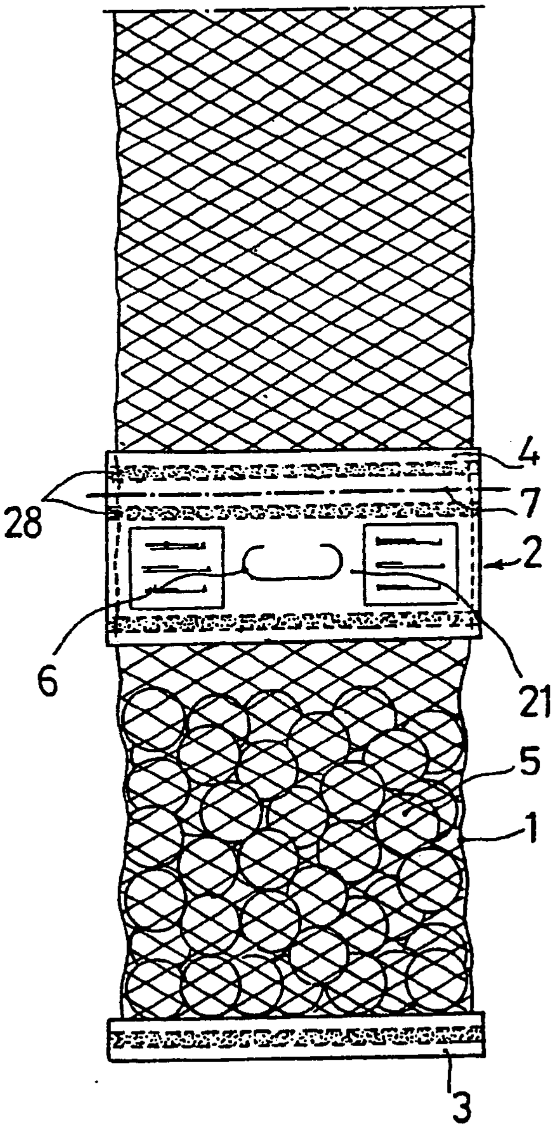


FIG. 2

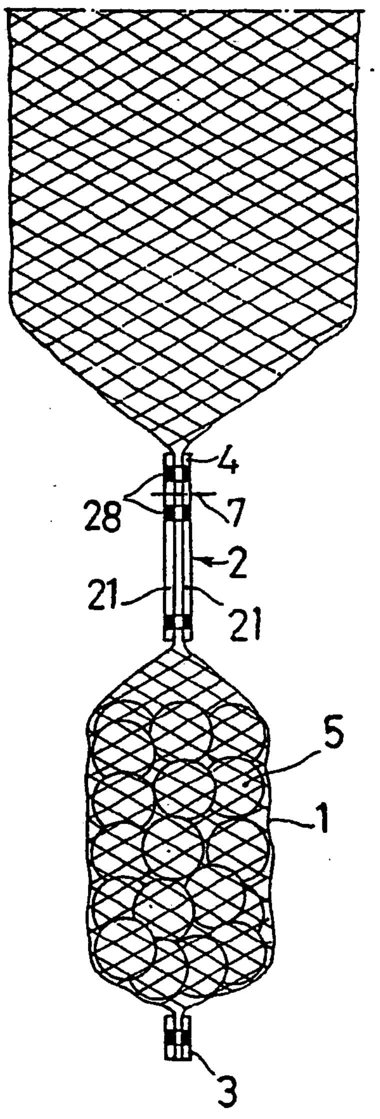


FIG. 3

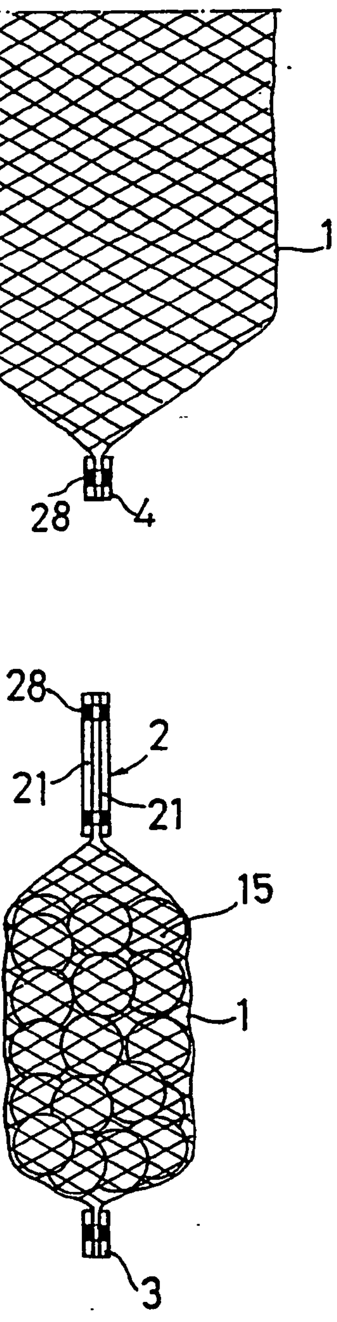


FIG. 4

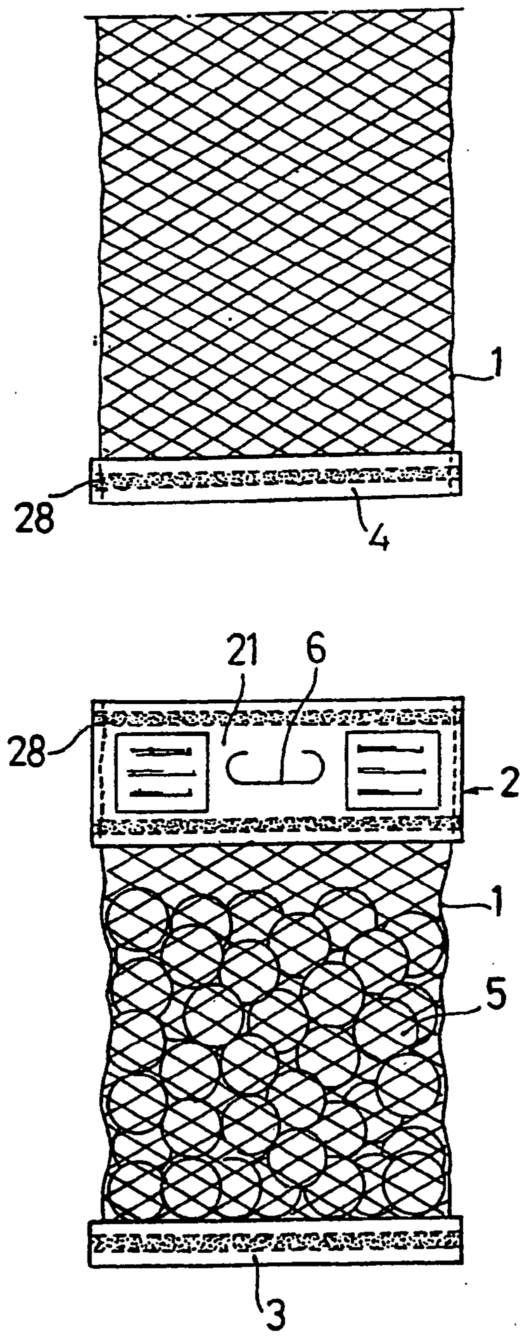


FIG. 5

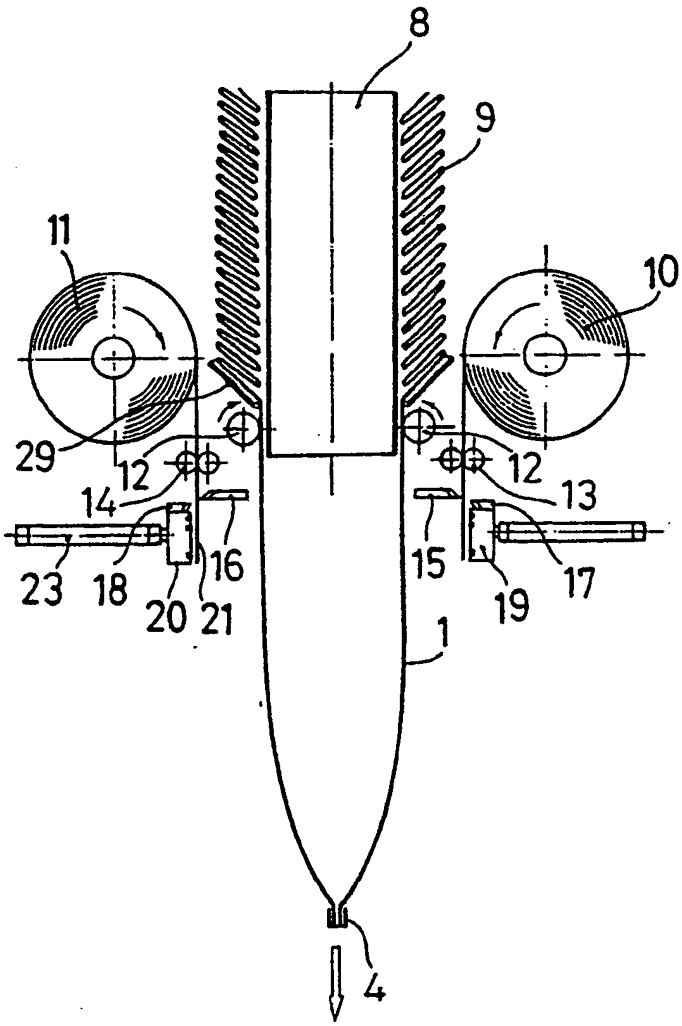


FIG.6

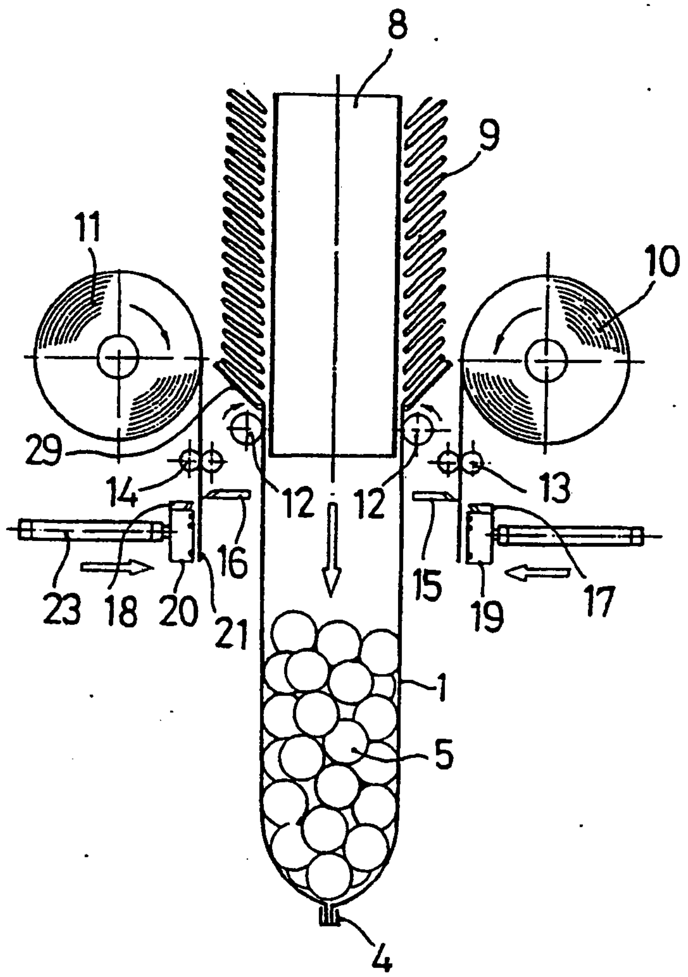


FIG. 7

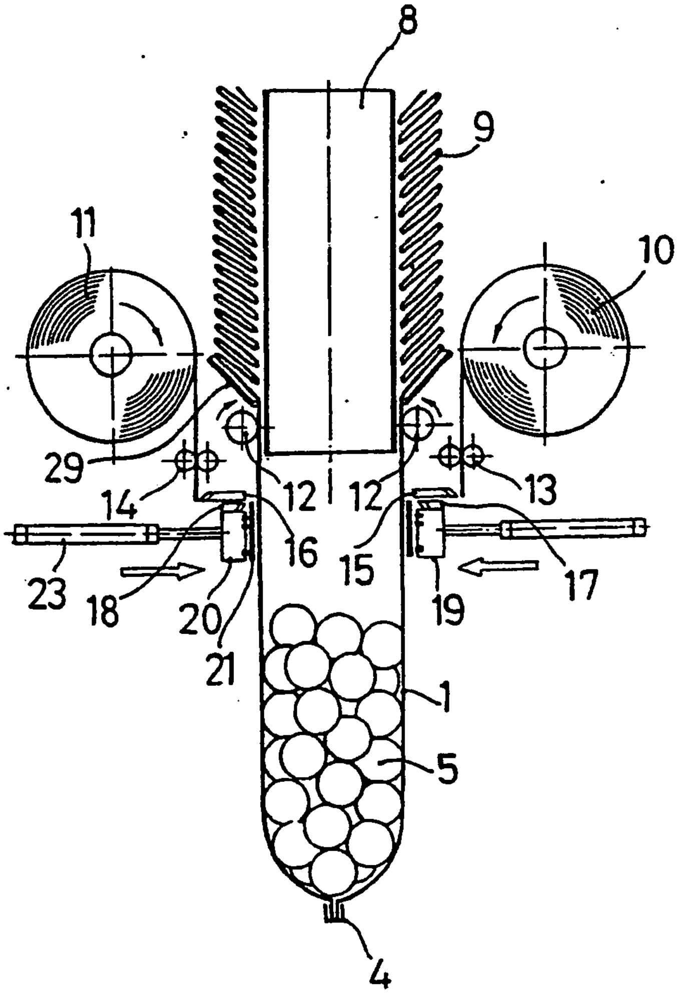


FIG.8

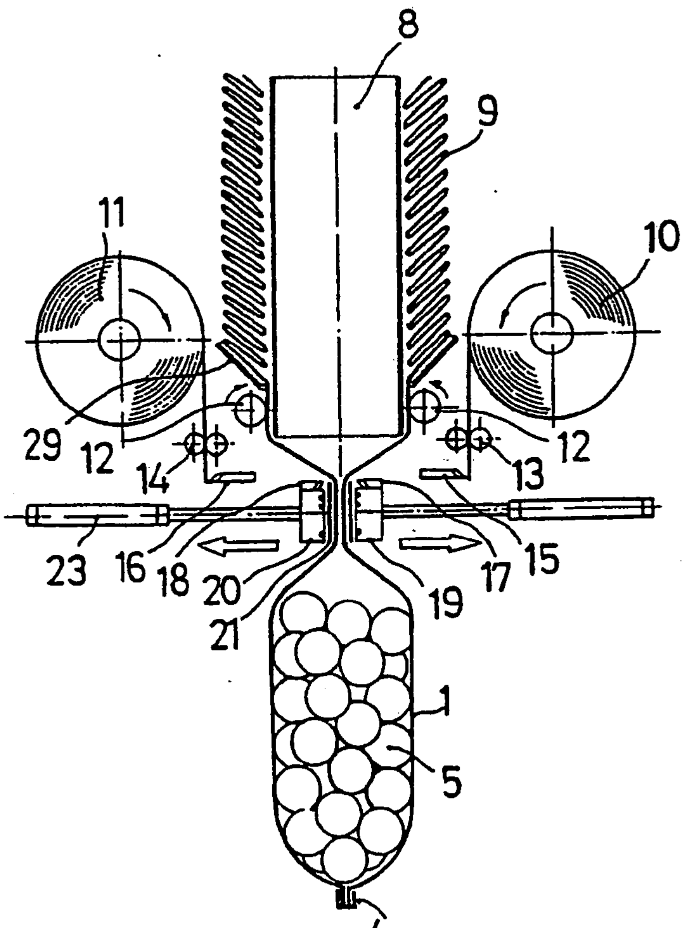


FIG. 9

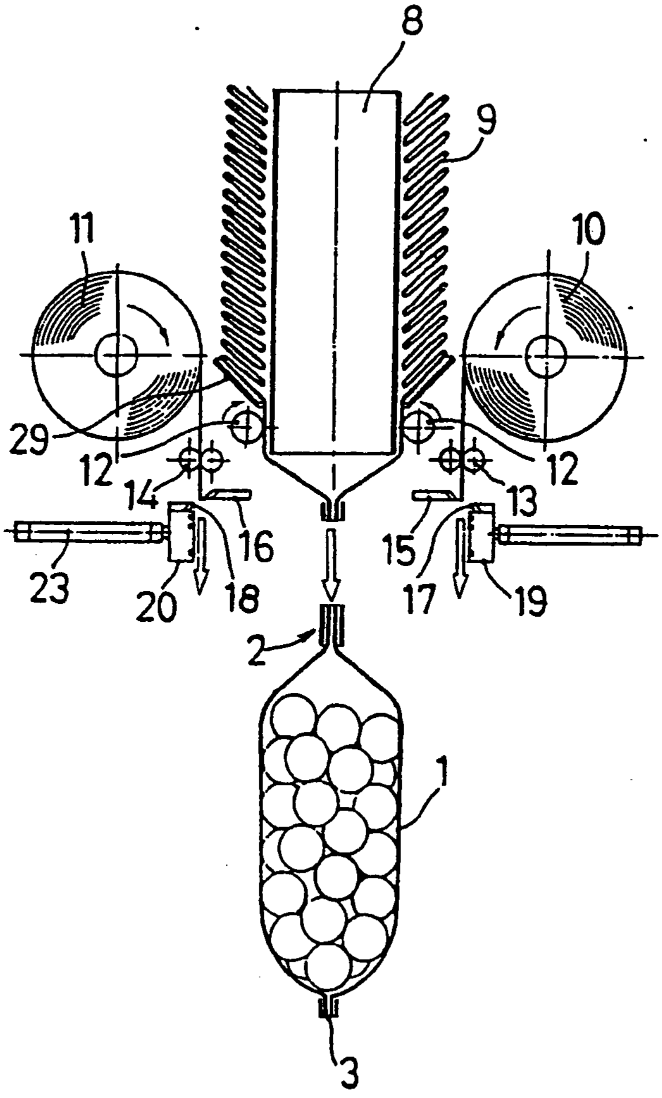


FIG. 10

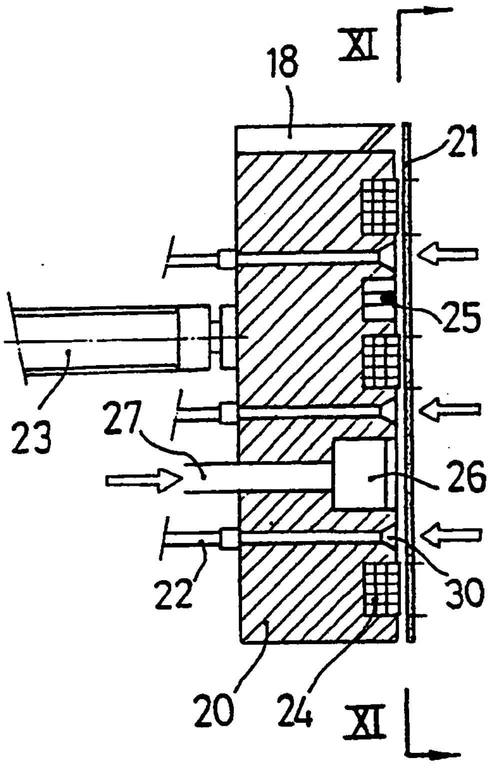
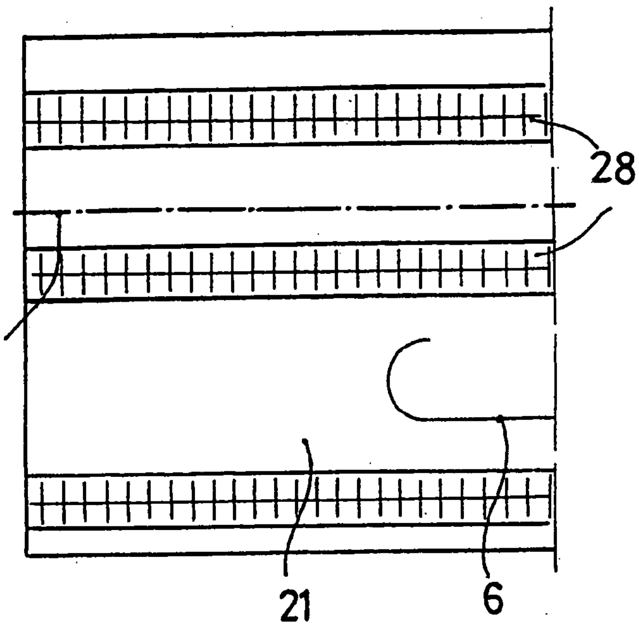


FIG. 11



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EUROPEAN SEARCH REPORT

Application Number

EP 88 11 2574

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	FR-A-2 151 155 (MAN. TOURANGELLE D'INSTRUMENTS DE PESAGE) * Page 4, line 20 - page 7, line 4; figures *	1,2,4,5	B 65 B 9/15
Y	---	3	
Y	DE-B-1 161 208 (HAMAC-HANSELLA) * Column 2, line 36 - column 3, line 24; figures * ---	3	
A	FR-A-2 099 733 (MAN. TOURANGELLE D'INSTRUMENTS DE PESAGE) ---		
A	DE-A-2 636 821 (TAKASAKI) -----		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09-11-1988	JAGUSIAK A.H.G.

CATEGORY OF CITED DOCUMENTS

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